University of Amsterdam

Nikhef

KM3NeT

Reconstruction Meeting

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Proceedings Reminder

- Minutes from the last reco-meeting can be found on the corresponding Indico webpage

- I will create a google form to collect some ideas/topics for the in-depth presentations and for improving documentation

Reconstruction meeting format (Bouke)

We discussed and decided upon a format for the future reconstruction meetings. A summary of the most important points can be found below:

- Frequency
  - once every two weeks, starting from mid-August
- Accessibility
  - allow all Nikhef-KM3NeTters to join, if interested
  - Bouke will email the rest of the group to spread the word
- Contents:
  - A usual round to discuss the on-going reconstruction analyses
  - Brian: Threshold for discussion will be kept very low; everyone is welcome to bring up analysis-details and/or points of confusion
  - Start every second reconstruction meeting with a more dedicated in-depth discussion about a reconstruction-related topic (e.g. a 30 min presentation, similar to the junior meetings)
- Procedure:
  - Chair will write minutes with the discussed points at the end of every meeting
  - Jordan: Reconstruction meetings should be seen as an opportunity for improving the documentation and updating the wiki

Thijs - shower elongation and Jpp PDFs

Thijs showed a toy model which can be used to study the accuracy of reconstruction based on the Jpp arrival time PDFs. The toy model samples eight light emission points along the longitudin

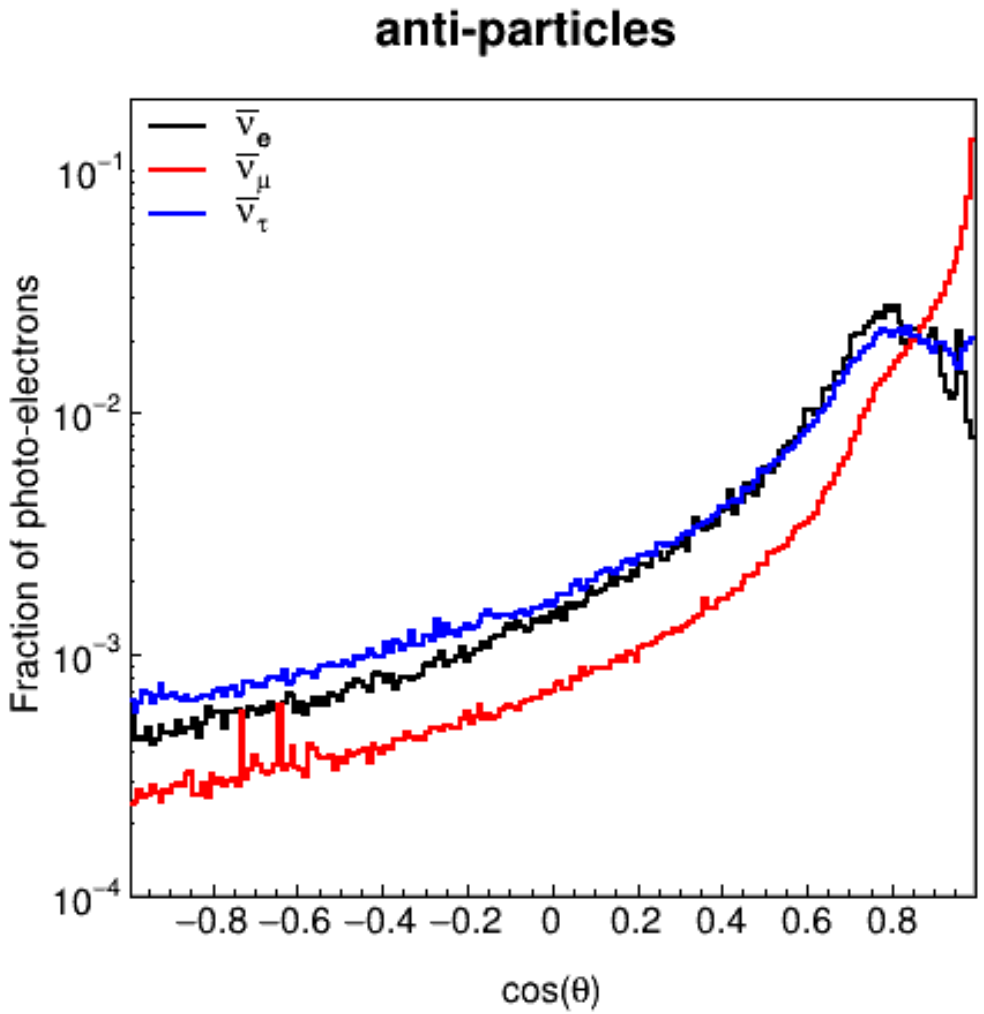
Comparing the Light Distributions
for Different Neutrino Flavours

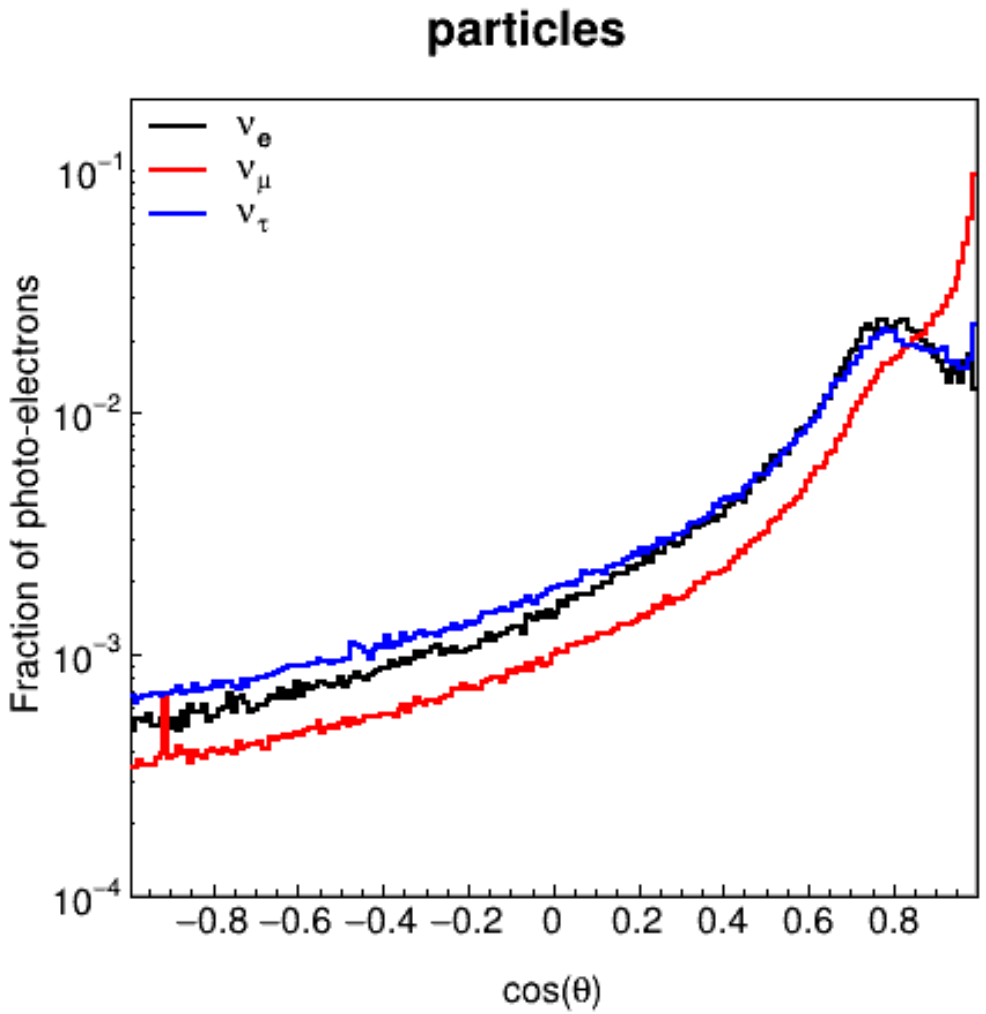
Motivation

- Depending upon the type of neutrino that interacts, Cherenkov light may be emitted preferrentially in the forwards or backwards direction
    - Evident for muon-(anti)neutrino interactions versus other flavours (i.e. track or shower)
    - But perhaps also for tau-neutrinos:
        - Can decay hadronically
        - Produced almost at rest at low neutrino energies

--> Analyzed 10 KM3Sim files for each (anti-)neutrino flavour, with $O(10^4)$ interactions at 10-100 GeV energies

Flavour comparison

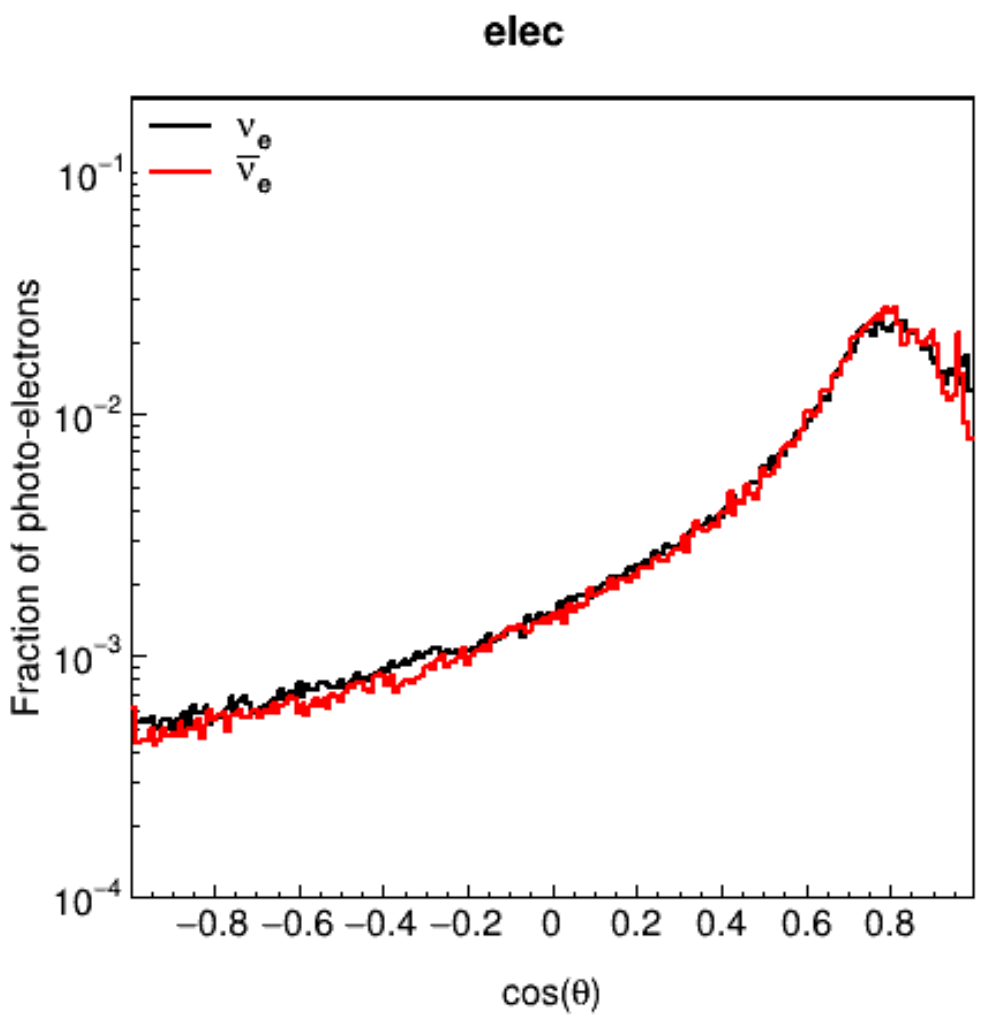




Discussion

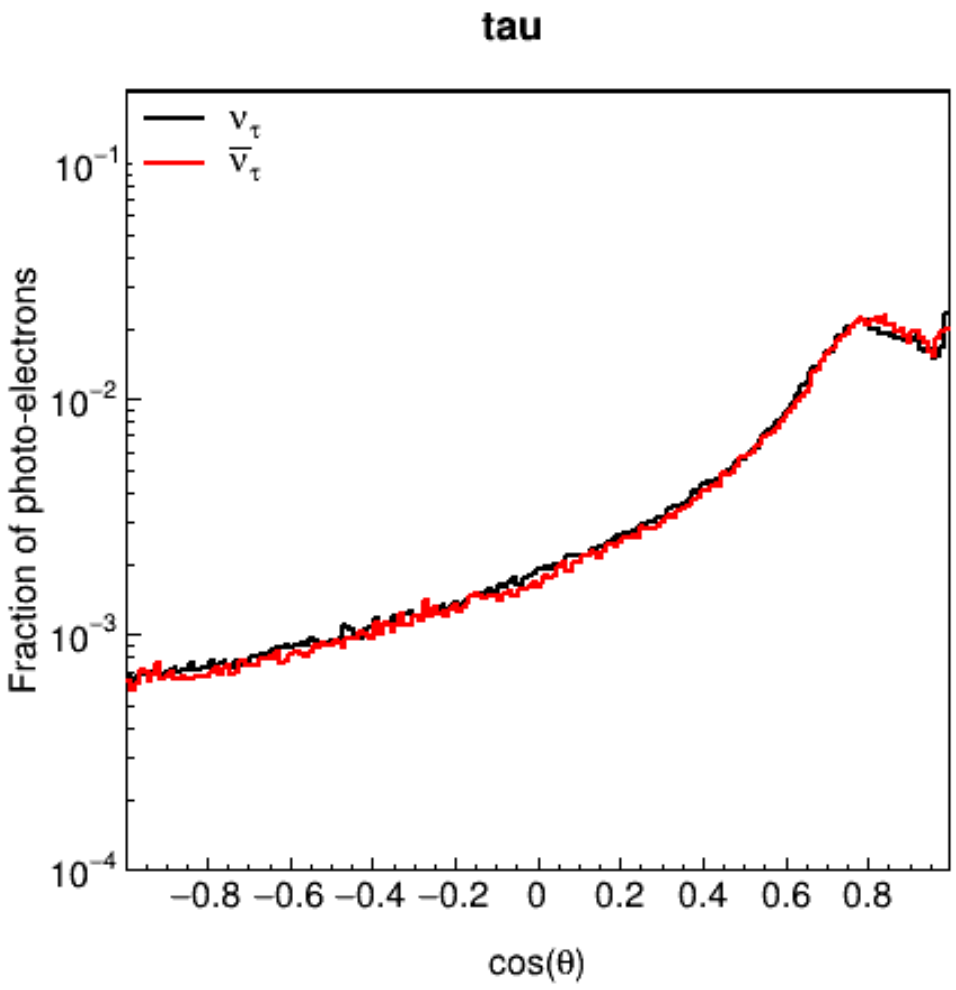
- Muon-neutrinos emit most light in the forward direction (no surprise)
- Both tau-neutrinos and tau-antineutrinos seem to emit slightly more light in the backward direction than their electron counterparts
- What about neutrinos versus antineutrinos?

Neutrino versus Antineutrino



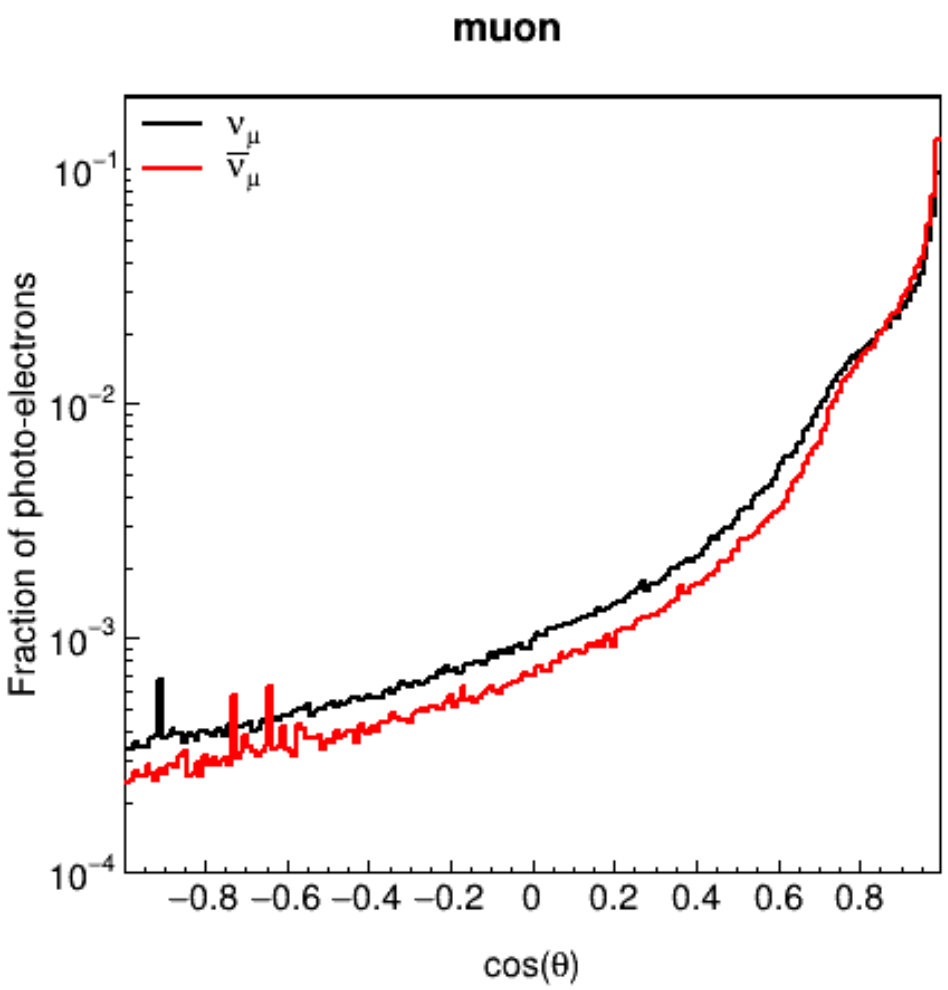
- No difference for electron (anti-)neutrinos

Neutrino versus Antineutrino



- No difference for electron (anti-)neutrinos
- Or tau (anti-)neutrinos

Neutrino versus Antineutrino



- No difference for electron (anti-)neutrinos
- Or tau (anti-)neutrinos
- Seemingly more light backwards for muon-neutrinos than for muon-antineutrinos
  - Physics?
  - Or some artifact in the generation/normalisation?